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Patterns of Business Creation, Survival and Growth

Evidence from Africa

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Abstract

The authors study firm dynamics using a novel database of all formally registered firms in Cote d'Ivoire from 1977 to 1997, which account for about 60 percent of gross domestic product. First, they examine entry and exit patterns and the role of new and exiting firms versus incumbents in job creation and destruction. They find that while the rate of job creation at new firms is quiet high—at 8 percent on average—the number of jobs added by new firms is small in absolute terms. Next, they examine survival rates and find that the probability of survival increases monotonically with firm size, but manufacturing and foreign-owned firms face higher likelihoods of exit compared with service oriented and domestically owned firms. They find that higher growth of gross domestic product increases the probability of firm survival, but this is a broad impact with no firm size disproportionately affected. In robustness checks, they find that after 1987 size is no longer a significant determinant of firm survival for new entrants, suggesting that the operating environment for firms changed. Finally, they find that trade and fiscal reform episodes raised the probability of firm exit and attenuated the survival disadvantages faced by smaller firms, but exchange rate revaluation and pro-private sector reforms did not significantly lower the likelihood of exit.

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Patterns of Business Creation, Survival and Growth: Evidence from Africa[*]

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1. Introduction

Firm entry and exit – Schumpeterian "creative destruction" – is critical for the continued dynamism of the modern economy. Though evidence has linked entrepreneurship and economic growth in developed countries,[1] we have scarce evidence that such a relationship exists in developing countries. For instance, to what extent does formal sector entrepreneurship contribute to job creation in countries with regulatory, legal, and tax barriers to entry and exit? What factors are related to firm survival in a low-income country? In this paper, we examine job creation and destruction, at both new and incumbent firms, in Cote d'Ivoire, ranked 169 of 181 countries in the 2011 Doing Business "Ease of Doing Business" ranking (where 1 indicates the most favorable business environment) (World Bank, 2010a).

We use a new and unique database that includes the complete census of registered firms in Cote d'Ivoire from 1976 through 1997 to answer these questions.[2] This includes data collected at the time of registration (ownership and sector) as well as annual reporting of total employment. Unlike comparable studies that rely on survey data or manufacturing censuses, we broaden existing studies to compute over time comprehensive formal sector entry and exit rates, as well as growth, contraction, and survival at incumbent firms. Moreover, since we use a census of formal sector firms that extends beyond the manufacturing sector, we can analyze the impact of macroeconomic and other shocks on sector distributions.

First, we examine business dynamics in Cote d'Ivoire. We decompose trends in job creation and growth into entry of new firms and expansion of incumbent firms, and job destruction into exit and contraction. We also examine the distribution of firms by size, sector, and ownership. We find that job creation by new firms is quite high at 8% on average, but the number of jobs added by new firms is small in absolute terms. Next, we use a discrete time duration model to examine the relationship of GDP growth, reform episodes, and firm survival. We find that, on average, a 1% increase in GDP growth lowers the likelihood of exit by 1.7%, while trade liberalization and fiscal adjustment episodes raised the overall likelihood of exit but attenuated the probability of exit for small and medium sized firms relative to large firms. A

[1] For example, see Haltiwanger et al. (2009a); Klapper et al. (2006); Djankov et al. (2002).
[2] Regulatory changes related to the modernization of the Registrar of Companies in 1998 prevent us from extending the time series.

caveat to our survival results, however, is the reliance on time series variation, which leads to weak identification.

New research on the survival of formal firms in low-income countries has important implications for development strategies. In order for the private sector to act as an 'engine of growth' and advance the development process, it is necessary for firms to survive and grow. It is also important for policy makers to understand and consider the impact of government policies on private sector survival and growth.

An important caveat is that our analysis covers all formally registered firms, but excludes firms that operate informally, even though the informal economy encompasses an estimated 72% of jobs in Sub-Saharan Africa (OECD, 2009).[3] Yet it remains important to understand job dynamics among formal sector firms, since the inability of economies to create legal jobs is one of the causes of the expansion of the informal economy. Data from the World Bank Enterprise Surveys of informal firms in three African countries suggests that most informal firms have less than 2 employees and unlikely to contribute to job creation. For instance, 46% of informal firms in Cote d'Ivoire (as compared to 39% in Madagascar and 31% in Mauritius) start not because the owner sees a good business opportunity, but because the (largest) owner could not find alternative employment opportunities ("unwilling" entrepreneurs). Furthermore, 81% of firms in Cote d'Ivoire (as compared to 72% in Madagascar and 49% in Mauritius) operate within household premises and few have paid non-family employees (World Bank, 2010b).[4]

Furthermore, in general, labor productivity and TFP are higher on average in formal firms than in large informal firms, which in turn have higher productivity than small informal firms (Amin, 2009). The literature also highlights other potential advantages of formal sector participation for large firms, including police and judicial protection (and less vulnerability to corruption and the demand for bribes), access to formal credit institutions, the ability to use formal labor contracts, and greater access to foreign markets (Schneider and Enste, 2000). Firms that choose to remain informal may be unable to realize their full growth potential. Therefore, "high-growth" entrepreneurship, which is most likely to lead to formal job creation and

[3] The formal sector represents around 60% of GDP in Cote d'Ivoire (OECD, 2004; Berthelamy and Bourguignon, 1996).
[4] The Mauritius statistics are statistically different from those of Cote d'Ivoire at the 1% level; the Madagascar statistics are not significantly different from those of Cote d'Ivoire even at the 10% level.

macroeconomic growth, is most likely to happen through formally registered firms. These weaknesses in the informal sector suggest that understanding the drivers of formal firm entry and survival are key to promoting economic growth and employment.

The paper proceeds as follows. Section 2 reviews previous literature related to firm dynamics. Section 3 reviews the relevant economic and political history in Cote d'Ivoire. Section 4 presents the data set and summary statistics. Section 5 presents business dynamics, survival test methodology, and results. Section 6 concludes.

2. Related literature

Empirical studies of firm dynamics overwhelmingly focus on firm behavior in the US, Canada, and other industrialized countries.[5] In general, these studies find that gross entry is substantial in most industries and is significantly higher than net entry due to the high death rate of infant firms (for example, see Haltiwanger, et al. 2008a).[6] Successful entrants grow rapidly, so that an entrant cohort's initial market share falls slowly. For instance, an early study of patterns of firm entry, growth, and exit in US manufacturing industries over the period 1963-1982 shows that there are substantial and persistent differences in entry and exit rates across industries and that industries with higher than average entry rates tend to also have higher than average exit rates (Dunne et al., 1988). The authors also find that most entrants and exiters are substantially smaller than continuing producers.

Recent cross-country studies have examined the impact of country characteristics. For example, a study of entry rates in over 100 countries finds significant relationships between entrepreneurial activity and indicators of economic and financial development and growth, the quality of the legal and regulatory environment, and governance (Klapper et al., 2010; Klapper and Love, 2011a and 2011b). The literature also considers the relationship of the legal and regulatory environment on firm entry and growth. For instance, Klapper et al. (2006) provides a comprehensive picture of entry rates across high- and middle-income countries in Europe (using a firm-level database of registered firms) showing that onerous entry regulations hamper the creation of new firms, especially in industries that naturally should have high entry. Furthermore,

[5] See Caves (1998) for a thorough survey of the literature on job turnover and firm mobility.
[6] There is also a substantial literature on entry into an industry (possibly by a firm from another industry) as distinguished from firm creation or entrepreneurship; see Gilbert (1989) for a comprehensive survey.

the consequences of regulatory barriers against entrepreneurship are seen, not in young firms, but in older firms, who grow more slowly and to a smaller size. Desai et al. (2003) uses the same database and a cross-country approach and find complementary evidence that entry regulations have a negative impact on firm entry. Scarpetta et al. (2002) using firm-level data from OECD countries to analyze firm entry and exit finds that higher product market and labor regulations are negatively correlated with the entry of small and medium sized enterprises (SMEs) in OECD countries.

A number of studies have also used firm surveys to study the determinants of firm growth. Using a survey of manufacturing firms in Cote d'Ivoire, Sleuwaegen and Goedhuys (2002) find that younger firms grow faster than older firms, but larger entrants experience greater growth opportunities that improve over time. Yet a shortcoming of most studies in low- and middle-income countries is their dependence on survey data. The reliance on survey data poses limitations since firm entry is typically not observed, the data is biased towards surviving firms, and time series are short. Mead and Liedholm (1998) rely on survey data from five Eastern and Southern African countries (Botswana, Kenya, Malawi, Swaziland, and Zimbabwe) as well as the Dominican Republic to examine the magnitude and determinants of firm births, deaths, and expansions of micro and small enterprises (MSEs). The authors find that the annual rate of new MSE start-ups averages over 20%, and that the vast majority of new firms were one-person establishments. Shiferaw (2007, 2009) and Bedi and Shiferaw (2009) are notable exceptions to the majority of African firm-level studies that depend on survey data and instead utilize manufacturing census data. However, in their studies of Ethiopian establishments the authors still face stock sampling (survivorship bias) problems and are limited to the manufacturing sector.

Another important question in the literature is the determinants of firm survival. For example, evidence from Portuguese manufacturing firms suggests that drivers of a firm's survival include start-up size, with larger firms having a higher probability of survival, and fast growing industries having a positive effect on firm duration. Furthermore, the probability of firm failure decreases with the age of the firm, consistent with the view that firm entry is a process of selection and learning (Mata and Portugal, 1994). More recently, Frazer (2005) and Soderbom et al. (2006) use manufacturing data from the Regional Program on Enterprise Development (RPED) surveys of Ghana, Kenya, and Tanzania to analyze the role of productivity in firm

survival and find that selection on efficiency exists among larger firms but less so for small firms. Supporting these results, Shiferaw (2009) finds that the probability of firm exit is lower in expanding industries and that productive firms are less likely to exit among Ethiopian manufacturing firms.

Finally, the literature examines the impact of macroeconomic and other shocks on private sector behavior. For instance, large macroeconomic disturbances are found to affect the firm turnover process. A study of new firms in the U.S. finds that startup rates are substantially shaped by both macroeconomic fluctuations as well as industry-specific characteristics; macroeconomic expansion serves as a catalyst for startup activity, but new-firm startups are promoted by a low cost of capital as well as high unemployment rates (Audretsch and Acs, 1994). Levinsohn (1999) investigates employment patterns in Chilean manufacturing firms following a major trade liberalization between 1975-1979, which made the economy more outward-oriented, removed quantitative trade restrictions and slashed tariff rates, privatized firms, relaxed government controlled prices, and reformed financial markets. He finds that in the years following trade liberalization, firm size matters for job creation and destruction; job churning is very high in both expanding and contracting industries; and job creation and destruction varies with whether the firm is operating in the tradable or non-tradable sectors. The importance of firm size in determining survival is supported by another study that examines firms in Ghana, Kenya, and Tanzania during the 1990s, when market reforms were implemented to eliminate protection of the domestic firms (Harding et al., 2004). To summarize, the literature in developing countries generally finds that the main determinant of firm exit is size, with small firms having much higher exit rates than large firms.

3. Macroeconomic background and government reforms

In 2010, Cote d'Ivoire ranked 149 out of 177 in the UNDP "Human Development Index" (UNDP, 2010).[7] This followed a period of political instability and civil war (2002 to 2003). Yet, Cote d'Ivoire remains one of the largest economies in the region and accounts for close to 40% of the

[7] This section draws on Trebesch (2008), Reuda-Sabater and Stone (1992), and Library of Congress Country Studies (1988).

economic activity in the West Africa Economic Monetary Union (WAEMU).[8] For example, in 2009, GDP in Cote d'Ivoire was US$ 23 billion, as compared to US$ 15 billion in Ghana, US$ 13 billion in Senegal, and US$ 8 billion in Burkina Faso (World Bank, 2010c). Furthermore, the country's relatively high GDP per capita (US$ 1,674 in 2009) suggests opportunities for private sector development and growth exist.

Cote d'Ivoire grew rapidly after achieving independence in 1960, and by 1974, nominal GNI per capita rose from 190 to 450 CFA (over 300% in real terms). This expansion was primarily due to growth in the agricultural sector as the country benefitted from high international prices of coffee and cocoa, for which the country is a major exporter. In addition, the country's investment code during this period and relatively stable government and policies encouraged foreign capital investment in agribusiness activities (Tuinder, 1978). By 1978, the World Bank declared, "[t]he so-called 'Ivorian Miracle' has not been a matter of luck…" and the country's political stability and favorable economic environment led international organizations to believe that the country could be the first African country to achieve "developed" status (Tuinder, 1978).[9] However, with the collapse of coffee and cocoa prices and the oil shock in 1979, the Ivorian economy experienced a severe annualized contraction of 12% in 1980 and entered a prolonged recessionary period that persisted through most of the 1980s. For most of this period, GDP growth was less than 3% and private credit (as a percentage of GDP) sharply declined from about 30% to less than 20%.

After defaulting on commercial bank loans in 1983, the country undertook a series of foreign debt reschedulings with both official and private creditors. For the next decade, Cote d'Ivoire instituted a series of trade, fiscal, and monetary reforms. First, from 1985 to 1987, the government removed a series of import quotas, in order to increase competition and reduce prices. The government removed quantitative restrictions and unified effective rates of protection across intermediate and final goods, which reduced the competitive advantage of domestic manufacturing firms vis-à-vis foreign exporters (Harrison, 1994).

[8] Authors' calculation based on IMF World Economic Outlook nominal GDP data. Cote d'Ivoire also accounts for close to 4% of Sub-Saharan Africa nominal GDP and more than 20% of ECOWAS' output (authors' calculations based on IMF data).

[9] From 1960 until his death in 1993, the country was led by Houphouet-Boigny.

Following the implementation of this trade reform, domestic conditions deteriorated drastically in 1987 as international coffee prices dropping more than 30% (YoY), which led to a fiscal deficit greater than 8% of GNP, external debt ratios higher than 145% of GNP, and caused the government to declare an official debt moratorium in May 1987. In December 1987, the government reached a multi-year rescheduling of US$ 931 million with Paris Club creditors and an agreement with London Club creditors worth US$ 1,575 million in March 1988. In support of the agreements with creditors, the IMF extended US$ 240 million in loans in March 1988, and the government undertook a series of revenue-raising measures.

While the country's default episode was not fully resolved until 1998 (additional reschedulings occurred in 1989 and 1997), the workout arrangements with creditors and IMF support ensured access (albeit limited) to external capital markets. Yet by the late 1980s the government faced significant difficulties implementing IMF and World Bank mandated reforms, particularly attempts to contain the public sector wage bill which amounted to more than 60% of central government non-interest current expenditures (IMF, 1989). The rationale was that a reduction in public sector wages would help reduce the perceived opportunity cost of working in the private sector and promote a more vibrant private sector environment. These moves led to protests by trade unions, strikes, demonstrations, and a rise in student militancy in 1989 (IMF, 1991). At the end of 1991, the government announced its plans to abandon salary cuts and introduced a multi-party political system, which defused public protests.

Due to further deteriorations in the terms of trade, the Central Bank of West African States (BCEAO) implemented an IMF-supported nominal devaluation of the CFA by 50% in mid-January 1994 in an effort to restore the region's international competitiveness. After being pegged to the French franc at the same exchange rate for 46 years, the currency value was reduced from CFA/FRF 50 to CFA/FRF 100 (equivalent to CFA/EUR 656). Cote d'Ivoire responded well to the devaluation as the government simultaneously undertook a series of reforms to improve competitiveness and promote investment, including a revised investment code, removal of price controls and export duties on key exports, and privatization program, in order to maximize the benefits associated with the devaluation.

Our empirical analysis will focus on private sector dynamics over the business cycle. We will also examine the impact of private sector activity following the government trade, fiscal, and monetary interventions.

4. Data and summary statistics

The data set is comprised of 5,941 unique firms in Cote d'Ivoire from 1976 through 1997, which covers the complete census of formal, private sector firms in the country.[10] The data was hand-collected from paper filings at the "Registrar of Companies for the Modern Enterprise Sector", and does not include a sample bias of exited firms. These firms are required to pay the full range of taxes, and may benefit from bank finance and state technical assistance.

This data set appears to be consistent with the estimated overall private sector in Cote d'Ivoire, which includes, on average, about 800 large, formally registered enterprises (with at least 50 employees), several thousand formally and informally operating medium-sized enterprises (10-50 employees), and several hundred thousand informal microentrepreneurs, which mostly generate self-employment (Reuda-Sabater and Stone, 1992).

The structure of the data is an unbalanced panel of about 37,000 firm/year observations. That is, there is detailed information tracking firms over time and the data set includes firms that enter over the course of the sample period, as well as firms that exit during the sample. The variables of interest are information on sector classification at the two-digit sector level and firm ownership, collected at the time of registration, and annual data on firm employment, collected from required annual filings.[11] This data provides the first illustration of firm dynamics in a low-income country, across sectors and time.[12] This includes entry and exit rates, as well as job creation and destruction rates at new versus incumbent firms.

[10] The database excludes the primary sectors and state-owned firms.
[11] All registered companies are required to submit annual filings to the Registrar of Companies with financial and employment information. Our panel includes only two missing firm/year observations.
[12] Related work in Colombia and Ethiopia includes only the manufacturing sector. For Colombia see, for example, Eslava et al. (2009), (2010); for Ethiopia see, for example, Shiferaw (2007), (2009), and Bedi and Shiferaw (2009).

4.1 Business and employment formation

On average, there are about 2,000 registered firms per year, with on average 29 employees (and a median employment of 7), which employ in total about 100,000 individuals. This is a small fraction of overall employment, including individuals self-employed or employed in the informal sector, and the relevance of the informal sector to job creation is undeniable; the informal "shadow economy" is excluded because of lack of data.

Figure 1 shows that while there is little variation in the total number of registered firms in a given year (beginning in 1981 the stock ranges from 1,800 to 2,000 firms), total employment in the formal private sector declines over time (from a high of about 130,000 in 1978 to a low of 60,000 employees in 1995).

Figure 2, Panel A presents summary statistics, by size buckets over the entire sample period. For the purpose of our analysis, we define "micro" as less than 10 employees; "small" as 10-49 employees; "medium" as 50-149 employees; and "large" as more than 150 employees. Economy-wide, 40% of firms have less than 10 employees and an additional 40% of firms have 10-49 employees. In addition, 10% of firms in Cote d'Ivoire are sole proprietors. Figure 2, Panel B shows the distribution of employment by firm size. In contrast to the distribution of firms, the majority of employment (63%) is found at large firms (greater than 150 employees), while on average, only 3% of formal sector employees are employed at micro firms (less than 10 employees).

The small percentage of registered firms in Cote d'Ivoire with less than 10 employees (40%) (relative to the large number of informal microenterprises as well as the large number of micro-sized firms in developed countries) and the low share of employment at micro firms might be explained by burdensome regulations, high marginal tax rates, the absence of monitoring and compliance (of both registration and tax regulations) and other weaknesses in the business environment, which encourage sole-proprietors to evade regulations and operate in the informal sector.[13] For instance, the cost of starting a business (as a percentage of income per capita) is 133% in Cote d'Ivoire versus 95.4%, on average, in Sub-Saharan Africa, and the minimum capital required to start a business (as a percentage of income per capita) is 203% in Cote d'Ivoire,

[13] The benefits of formal sector registration might vary by industry. This is discussed in Section 5.3.

versus 145% elsewhere in Sub-Saharan Africa (World Bank, 2010a). Registering a business requires a notary to certify the paid in capital, which takes 2 days and costs 10% of the initial capital. The tendency of firms in Cote d'Ivoire to choose to remain micro or informal might also suggest that firms are unable to realize their full growth potential.

Figure 3 shows the distribution of firms and employees, by sector. Although almost 50% of firms identify themselves as service providers, 46% of employment is generated by the manufacturing sector, which makes up only 17% of the number of firms (as compared to 37% of employment in the service sector). At first glance, it is surprising that manufacturing firms – which require relatively higher levels of investment, human resources, and capital – make up a considerable share of firms in Cote d'Ivoire; for example, financial development (measured as domestic credit to the private sector as a percentage of GDP) is only 33% over our sample period.

The lack of access to domestic finance might also explain the notable differences in firm size distribution, by sector. Though the manufacturing sector has the fewest number of firms, average firm size is significantly larger than it is for firms operating in the trade or service sectors. However, the median firm size is small across all sectors, with only 13 employees. Strikingly, across all sectors we find less than half of all firms fall in the category of 10-49 employees, which is novel evidence suggesting that a distorted firm size distribution relative to developed economies exists in sectors beyond manufacturing.

Within the manufacturing sector, we find 14% of firms in Cote d'Ivoire are micro (less than 10 employees) and 42% are medium or large (more than 50 employees); possibly, the efficiency of manufacturing firms in Cote d'Ivoire is limited by institutional barriers.[14] In addition, 45% of service sector firms operate with less than 10 employees and close to 50% of firms operating in the tradable sector have less than 10 employees, while only 3% of trade sector firms in Cote d'Ivoire are large. It might be the case that in developing countries with costly and timely barriers to starting a business, firms in the manufacturing sector have the greatest incentive to register. However, we leave a formal analysis of the firm size distribution as future research.

[14] Bedi and Shiferaw (2009) find a similar distribution in the manufacturing sector: 70% of establishments operate with less than 50 employees.

We also examine the distribution firms by ownership (not shown). Approximately 70% of Ivorian firms are owned by foreigners from industrialized countries with the majority of these owners being French.[15] We find a nearly identical distribution of firm size, with the majority of both domestic and foreign owned firms having less than 50 employees. We also find very similar sector distribution, although foreign-owned firms are more likely service sector (50%, versus 45% of domestic firms) and manufacturing firms (19%, versus 14% of domestic firms).

5. Results

5.1 Firm and employment dynamics

In an effort to describe the entry and exit patterns of Ivorian firms, we begin by constructing measures of entry and exit as well as their size relative to other firms in the industry. We count a firm as a new entrant if it appears for a second year, that is, we exclude firms that survive less than a year.

Similar to Dunne et al. (1988), we define the following variables, where "bucket i" is equal to either 2-digit industry classifications (manufacturing, services, or trade) or size (micro, small, medium or large):

NE_{it} = number of firms that enter bucket *i* between years *t-1* and *t*

NT_{it} = total number of firms in bucket *i* in year *t*, including firms that enter bucket *i* between years *t-1* and *t*

$NX_{i(t-1)}$ = number of firms that exit bucket *i* between years *t-1* and *t*

[15] While the large concentration of foreign ownership is likely higher than that found in other low-income countries, the result is reasonable in the Cote d'Ivoire context given the colonial ties to France and the difficulty of foreign owned firms to evade registration. For example, in the 1970's, 40% of capital in the private sector was owned by French interests and many so-called domestically-owned firms were subsidiaries of French companies (Tuinder, 1978). Furthermore, since birth in Cote d'Ivoire does not automatically confer citizenship (one parent must be an Ivorian citizen), the exclusion of some ethnic minorities active in the business community (such as the Lebanese population) may underestimate the number of Ivorian owned firms (Mundt, 1997). For instance, a 1989 study by the Gama Centre of Ivorian private sector firms finds that one-half were owned by local non-African expatriates and an additional one-third owned by non-Ivoirian Africans (Reuda-Sabater and Stone, 1992).

Next, we construct entry (ER_{it}), exit (XR_{it}), and turnover (TR_{it}) rates as:

$$ER_{it} = NE_{it} / NT_{i(t-1)} \quad (1)$$

$$XR_{i(t-1)} = NX_{i(t-1)} / NT_{i(t-1)} \quad (2)$$

$$TR_{it} = (NE_{it} + NX_{it}) / NT_{i(t-1)} \quad (3)$$

The denominator for both entry and exit rates is the total number of firms in bucket i in year t-1. This is because we want to capture the pool of potential exiting firms. These measures are comparable to gross measures of entry and exit and allow us to compare our findings to those of US firm studies.

We also construct survival rates as the probability of exiting at *t* using the Kaplan-Meier estimator such that:

$$S(t) = \prod_{j=1}^{t} [(n-t)/(n-j+1)]^{\delta(t)}. \quad (4)$$

S(t) is the estimated survival function, n is the total number of firm lifespans, and (δ)t is a dummy equal to one for completed spells and 0 for censored spells. In our sample we find that the average lifespan of firms is 6.9 years, with a median of 5.0 years.

We follow Haltiwanger et al.'s (2008a) analysis of business dynamics in the US where firm-level employment growth is:[16]

$$g_{it} = (E_{it} - E_{i(t-1)}) / X_{it}, \text{where } X_{it} = 0.5*(E_{it} + E_{i(t-1)}) \quad (5)$$

and aggregate employment growth is given by the weighted average of firm-level growth:

$$g_t = \Sigma_i (X_{it} / X_t) g_{it}, \text{ where } X_t = \Sigma_i X_{it}. \quad (6)$$

Employment growth can be decomposed into creation and destruction:

$$JC_t = \Sigma_i (X_{it} / X_t) \max\{g_{it}, 0\} \quad (7)$$

[16] This follows the methodology of Davis et al. (1994).

$$JD_t = \sum_i (X_{it}/X_t) \max\{-g_{it}, 0\} \quad (8)$$

Next we decompose job creation into entry and expansion and job destruction into exit and contraction:

$$JC\_Entry_t = \Sigma_i (X_{it} / X_t) I\{g_{it} = 2\}, \quad (9)$$

where I is an indicator variable equal to one if the expression in the brackets holds and zero otherwise, and $g_{it} = 2$ denotes an entrant.

$$JD\_Exit_t = \sum_i (X_{it}/X_t)\, I\{g_{it} = -2\}, \quad (10)$$

where I is an indicator variable equal to one if the expression in the brackets holds and zero otherwise, and $g_{it} = -2$ denotes an exit.

We commence with an analysis of firm dynamics in Cote d'Ivoire over the sample period (Figure 4). Entry rates average 12.4% over the period, which is somewhat higher than the 8% average entry rates calculated by Klapper et al. (2010) for a broad sample of low- and middle-income countries based on data from the World Bank Entrepreneurship Survey. However, the high degree of volatility associated with Cote d'Ivoire's entry rates suggests a challenging business environment. Similarly, we find an average turnover rate of 24% with a high degree of volatility. These findings are consistent with Klapper et al. (2006) and Bartelsman et al. (2009) who find a (contemporaneous) relationship between entry rates and the business environment. We also examine one-year survival rates of firms in Cote d'Ivoire (Panel B) and discover that on average, 83% of firms survive until age 2.

Next, in Figure 5, we summarize employment dynamics at new and exited firms and jobs created and lost at incumbent firms. Panel A shows that on average, the job destruction rate at exiting firms is 7.3% versus 8.0% due to firings at incumbent firms. In comparison, the job creation rate at new firms is 8.0% versus 6.7% due to hiring at incumbent firms. Panel B shows the annual average job creation and destruction rates decomposed by source. Contrary to the findings in Panel A, hiring and firings at incumbent firms has a much stronger impact on net employment.

While Haltiwanger et al. (2008b) finds similar total job creation and destruction rates in the US, OECD countries, Latin America, and Eastern Europe, both entry and exit play a greater role in both job creation and destruction in Cote d'Ivoire. This finding may not be unique to Africa as Bedi and Shiferaw's (2009) research on Ethiopian manufacturing establishments finds a similar pattern to Cote d'Ivoire's. An important implication therefore, is that new firm creation appears to have the potential to be an important source of job creation in Cote d'Ivoire. This might suggest that expanding opportunities for entrepreneurial potential is important for macroeconomic growth that is not currently achievable. An important caveat, however, is that jobs created by new firms are highly volatile and not necessarily as good as those provided by large firms (Haltiwanger et al., 2009a, 2009b). This suggests that economic and employment growth in Cote d'Ivoire might be hampered by the inability of incumbent firms to grow. This data can be interpreted as quantitative evidence of the impact of barriers in the business environment – such as costly and timely procedures to obtain licenses, register property and movable collateral, resolve disputes, and close a business (World Bank, 2010a) – on private sector growth.

5.2 Survival analysis

The previous section highlights barriers in employment creation at existing incumbent firms. To better understand some of the barriers to growth, we begin by addressing the primary question of what determines firm survival.[17] Understanding the factors that appear to most influence firm survival is necessary for the development and implementation of policies that can improve and help firms better adapt and prepare for challenges as well as promote opportunities for growth. We aim to identify firm characteristics, such as sector and size, which predict greater vulnerability to economic conditions and policy interventions. We first examine the relationship between economic growth (measured by annual real GDP growth rates) and firm survival before exploring the impact of specific trade liberalization (1985-1987), deficit reduction and political reform (1989-1990), and exchange rate devaluation (1994) episodes on firm survival.

We acknowledge that our results cannot be fully interpreted as causal since there are many variables and underlying economic conditions that may play a role in determining firm

[17] We thank the referee for pointing out that survival strategies can be growth constraining.

survival that we do not observe. Additionally, since our analysis of reform episodes relies solely on time series variation, it results in weak identification. However, the findings can still provide a correlation between reform episodes and firm survival.

5.2.1 Firm dynamics and growth

We begin by summarizing firm and job dynamics, relative to annual GDP growth. Figure 6, Panels A and B, shows the absolute number and one-year growth rates of entering and exiting firms, by year, relative to one-year GDP growth. For most of the period, we find that the formal private sector both gains and loses about 200 firms per year, which corresponds to average entry and exit rates of around 10%.

Next, in Figure 7, Panels A and B, we present changes in new employment at new and exited firms (Panel A) and jobs created and lost at incumbent firms (Panel B), relative to annual GDP growth. Over time, net employment is always positive, that is more jobs are created at new firms than lost at exiting firms. However, the absolute number of new jobs added to the private sector by new firms is remarkably small – on average, fewer than 3,000 formal, private sector jobs are added on an annual basis. In comparison, the net number of new jobs generated at incumbent firms is negative for all years from 1979 through 1995. The largest net job losses occurred during the 1980 macroeconomic downturn – over 10,000 jobs were shed in 1979 – although net jobs at incumbent firms remained negative even during periods of GDP growth.

5.2.2 Empirical model

Our comprehensive panel data allows us to study the firm-level determinants of firm survival. Unlike previous studies, with the exception of Shiferaw (2007, 2009) and Bedi and Shiferaw (2009), we rely on census-based panel data, which allows for better tracking of firm entry and exit. However, we go beyond existing studies since we do not face a stock sampling problem (survivorship bias) and we use a long panel that allows firms sufficient time to follow their natural lifecycle and therefore minimize right-censoring. We also include firms outside of the manufacturing sector, which is important given the historically small size of manufacturing sectors in Sub-Saharan Africa.

We estimate a discrete time duration model with time-varying covariates and the parametric specification we consider is a proportional hazard model with a piecewise constant baseline hazard, first proposed by Prentice and Gloeckler (1978). We choose to estimate a piece-wise constant model rather than the more common Cox proportional hazard model or probit model because these models do not easily incorporate time-varying covariates and unobserved heterogeneity. Specifically, we estimate a baseline hazard with six parameters, $\lambda_j (j = 1,2,3,4,5,6)$: one for each of the first five three-year periods and one for the remaining years.[18] The benefit of a baseline hazard is its great flexibility and ease of estimation without imposing restrictive assumptions while the imposition of parameters with a greater than one-year horizon allows for more precise estimation. We also accommodate unobserved individual heterogeneity with the inclusion of a multiplicative error term in the hazard function (v_i), for which a gamma distribution with mean 1 and variance σ^2 is assumed.

The hazard function for firm i in period t is specified as being proportional to:

$$\exp(f(Z_i, W_t, X_{it})), \tag{11}$$

where W_t is a vector of GDP growth and reform dummies, Z_i is a vector that includes dummy variables for firm sector (manufacturing, tradables, services), location (commercial capital region of Abidjan or elsewhere), and ownership (foreign or domestic), and X_{it} is a vector of individual time varying characteristics of the firm, including current number of employees.[19]

For firm i we define τ_{it} as the elapsed duration since the firm's birth in period t and let T_i be the duration of the spell. Under the assumption of a proportional hazard model with a piecewise constant baseline hazard and unobserved heterogeneity, the hazard function can be expressed by:

$$\lambda(\tau_{it}|Z_i, W_t, X_{it}, v_i) = \lambda_\tau \exp\big(f(Z_i, W_t, X_{it})\big) v_i, \tag{12}$$

[18] In robustness checks we used different period lengths, which had no quantitative effects on our results.
[19] Refer to Table 1 for the definition of variables and summary statistics.

where v_i is the unobserved component for firm i, $\lambda_\tau = \lambda_j^*$ if $3(j-1) \leq \tau_{it} \leq 3j$ for $\tau_{it} \leq 15$ and $\lambda_\tau = \lambda_6^*$ if $\tau_{it} \geq 16$. Standard results imply that the survival function for T_i can be written as:

$$S(T_i \mid Z_i, W_t, X_{it}, v_i) = \exp\left\{-v_i \sum_{t=1}^{T_r} \lambda_{\tau re} \exp(Z_i, W_t, X_{it})\right\}. \qquad (13)$$

Therefore the contribution to the log-likelihood function from item i can be written as:

$$\ln(L_i) = \ln\left[S(T_i - 1 \mid Z_i, W_t, X_{it}) - \varsigma_i S(T_i \mid Z_i, W_t, X_{it})\right], \qquad (14)$$

where ς_i is a dummy variable which equals 1 for completed spells and 0 for (right) censored events.

5.2.3 Results

Table 1 presents summary statistics of our explanatory variables as well as the age of exiting firms. During the time period under consideration, we find that firm age upon exit is close to 7 years on average; firms in the retail/ wholesale trade sector have the lowest average age upon exit of 6.4 years, while service sector firms exhibit the highest average age at exit of 7.2 years. For comparison purposes, we find the age upon exit of firms in Cote d'Ivoire is similar to that found by Shiferaw's (2009) study on firms in Ethiopia's manufacturing sector. The majority of firms (90%) are located in the Abidjan region, which is the commercial and economic capital of the country, comprising some 50% of the country's non-agricultural population and generating 70% of all municipal revenue during the period.[20]

As discussed earlier, 18% of firms in our sample operate in the manufacturing sector, 34% in the trade sector, and 49% in the service sector. We categorize firms by their current employment size: micro (40%), small (40%), medium (12%), and large (8%). Finally, we include real annual GDP growth, which averaged 1.5% over the sample period. We use leading GDP growth in all of our analysis, GDP_{t+1}, to address endogeneity concerns arising from the largest

[20] Tuinder (1978).

firms disproportionate weight in aggregate GDP as well as the fact that we do not observe the firm in the year it disappears.

A common finding across our initial analysis is that foreign-owned firms have a higher likelihood of exit compared to domestically owned firms, while manufacturing firms also have a higher probability of exit relative to service sector firms. Given the deteriorating economic environment and increased political uncertainty during the period under consideration, which contributed towards the erosion of foreign and manufacturing firms previously privileged positions in the economy, these findings are in line with our expectations. Regarding the role of firm size in determining exit, we find a monotonic relationship, that is, larger firms are less likely to exit. This result supports the similar findings of Frazer (2005) and Soderbom et al. (2006) based on samples of manufacturing firms in Ghana, Kenya, and Tanzania. Finally, in our regressions we also find a flat baseline hazard (captured by the λs), which implies no duration dependence and suggests that we are adequately controlling for unobserved heterogeneity.

Table 2 presents the relationship of GDP growth and firm exit.[21] We find that, on average, a 1% increase in GDP growth lowers the likelihood of exit by 1.7%. In an effort to understand the business cycle role on firm survival, we use interaction terms to test for different impacts across sectors, size, and ownership. However, over our various specifications we do not find any differential effects, suggesting that economic growth broadly affects the private sector.

Table 3 considers separate regressions by industry in an effort to understand how robust the coefficients in Table 2 are.[22] In columns (1) and (2) we first consider the tradables sector firms and find that firms located in Abidjan face a higher probability of exit (around 27% higher), while foreign-owned firms also face a significantly higher likelihood of exit compared to domestically-owned firms. Micro and small-sized firms continue to face a significantly higher likelihood of exit compared to firms with at least 150 employees. We find that a 1% increase in GDP lowers the probability of exit by 2%, however, when we control for growth interaction effects (column 2), GDP growth is no longer significant. In columns (3) and (4) we consider manufacturing sector firms. Ownership and location do not have a significant effect on firm

[21] The baseline hazard function is defined as domestically-owned firms with at least 150 employees, located outside of Abidjan, and operating in the service sector.
[22] The baseline hazard function is defined as large firms, domestically owned, operating outside of Abidjan.

survival, but there exists a strong monotonic relationship between size and probability of exit, similar to the results shown in Table 2. The effect of GDP on firm survival is even stronger for the manufacturing sector, but again this effect disappears once we try to explore the role of size and ownership. Lastly, we consider the impact of GDP growth on service sector firm survival (columns 5 and 6). Location matters, with service sector firms based in the Abidjan region experiencing around a 20% lower likelihood of exit compared to domestically-owned firms. We find that the monotonic relationship between firm size and likelihood of exit also exists and that higher GDP growth reduces the likelihood of exit, but the effect of growth is weakest in the service sector compared to both manufacturing and tradable sector firms.

While not reported here, as further robustness checks to our main results, we estimated the same models using contemporaneous log employment levels in place of discrete size dummies; industry-specific real value-added growth and year dummies in place of real GDP growth; or adding contemporaneous or lagged private sector employment, produces qualitatively similar results.

In Table 4 we check whether different time periods may yield different drivers of firm survival.[23] We consider two periods: 1977-1987 and 1988-1996. This seemed like a natural period split since the trade liberalization episode had just ended and the fiscal/ political reform episode had not yet begun. It also allows sufficient time for firms to complete their natural lifecycle. Columns (1) to (4) report results for firm survival during the 1977-1987 period, while columns (5) to (8) presents the results based on new firm entrants beginning in 1988. In the period 1977-1987 foreign firms had a 21% higher likelihood of exit compared to domestically-owned firms, while manufacturing sector firms faced a more than 40% higher probability of exit compared to service sector firms. In the post-1987 period, foreign firms continued to face a similar probability of exit relative to domestically-owned firms, but we no longer find significant differences between sectors.

While on average, higher growth lowers the likelihood of firm exit for both time periods, GDP growth has a stronger effect during the later period: GDP grew only 0.6% per year on average between 1977 and 1987 but grew 3.5% per year on average between 1988 and 1996.

[23] The baseline hazard function is defined as large, domestically-owned firms located outside of Abidjan (and operating in the service sector for columns (1) and (5)).

Interestingly, the monotonic relationship between firm size and survival diminishes dramatically in the later period, suggesting a very different operating environment and that size is no longer a significant impediment to firm survival, contrary to previous findings. Only manufacturing sector firms with less than 10 employees faced a significantly higher probability of exit, but lower than that during the 1977-1987 period.

Table 5 presents the results of considering macroeconomic-relevant episodes and firm survival.[24] Consistent with standard trade liberalization findings (see, for example, Pavcnik, 2002 or Harrison, 1994), increased competition had a significant impact on firm survival, raising, on average, the hazard rate of firms by 85% relative to levels before the reform (column 1). Somewhat surprisingly, we do not find that the reform disproportionately impacted any one sector, despite our belief that both the tradables and manufacturing sectors would have been more adversely affected by the reform. We do find, however, that the trade reform mitigated some of the disadvantage that middle-sized firms (50-149 employees) faced relative to large firms, as large firms with their dominant market positions were hurt by the trade liberalization and unable to complete with new, more efficient entrants.

Column (2) presents the results of considering the 1989-1990 fiscal adjustment/ political reform on firm survival.[25] We find that the introduction of the reform and resulting uncertainty had a significant impact on firm survival, raising, on average, the hazard rate of firms by more than 100%, relative to levels prior to the reform. When we allow the impact to vary by size, sector, and ownership, we find stark differences. While foreign firms were more likely to exit prior to the reform episode, the reform increased the likelihood of exit by an additional 20%. Regarding the sectoral effects, we find that firms operating in the trade and manufacturing sectors have a 20% lower probability of exit relative to service sector firms after the reform. Finally, we find that relative to large firms (with at least 150 employees), the reform had an ameliorating effect on the higher likelihood of exit by smaller firms. Overall, these results are in line with the literature showing that larger firms tend to be more politically connected,

[24] The baseline hazard function is defined as domestically-owned firms with at least 150 employees, located outside of Abidjan, and operating in the service sector.

[25] An important caveat is that public sector wage reform might impact the survival rates of state-owned enterprises; although public firms are not included in our sample, growth in their wages could correlate with prices in the private market.

particularly in developing countries, and uncertainty surrounding these political relationships can negatively impact firms' performances (Faccio, 2006, 2007; Fisman, 2001).

Column (3) presents the results of the 50% nominal devaluation and subsequent pro-private sector reforms on firm survival. Contrary to the idea that a revaluation of the exchange rate can help restore international competitiveness, we find that, on average, the reform had no significant impact on firm survival. However, we do find that the tradables sector responded favorably to the episode, reducing the likelihood of exit by about 30% relative to the service sector firms. Regarding firm size, we find that the reform lessened the disadvantage middle-size firms faced relative to large firms by 50%.

6. Conclusion

We study firm dynamics using a database of all formally registered firms in Cote d'Ivoire from 1977 to 1997, which account for about 60% of GDP. Our analysis focuses on private sector dynamics over the business cycle. We also examine separate episodes of trade, fiscal, and monetary reforms and the relationship of these interventions with private sector dynamics.

First, we examine entry and exit patterns over this period and the role of new and exiting firms versus incumbents in job creation and destruction. We find that while the rate of job creation at new firms is quiet high at 8% on average, the absolute numbers of jobs added by new firms is small in absolute terms. Next, we examine survival rates and find that the probability of survival increases monotonically with firm size, but that manufacturing and foreign-owned firms face higher likelihoods of exit compared to service oriented and domestically-owned firms, respectively. We find that higher GDP growth increases the probability of firm survival, but this is a broad impact with no firm size disproportionately affected. In robustness checks we found that post-1987, size is no longer a significant determinant of firm survival for new entrants, suggesting that the operating environment for firms changed. Finally, we find that the trade and fiscal reform episodes raised the probability of firm exit particularly for large firms, but the exchange rate revaluation and pro-private sector reforms did not significantly lower the probability of exit.

Start-up firms in high-income countries, such as the U.S., generally enter small and face low survival rates, but those that do survive grow and create new jobs, displacing those firms that do not innovate. The low growth rates of firms in Cote d'Ivoire highlights the need to encourage and inspire greater experimentation and innovation among African entrepreneurs. Improvements in the institutional environment -- such as easing firm entry and closure -- might promote greater risk taking and high growth entrepreneurship.

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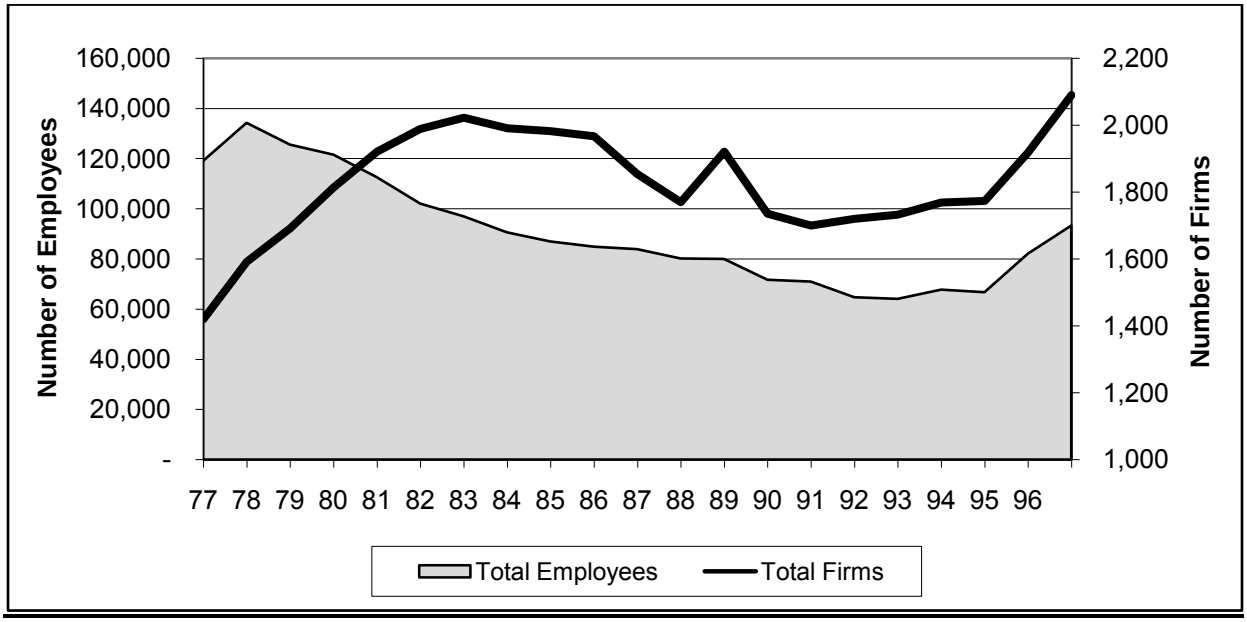
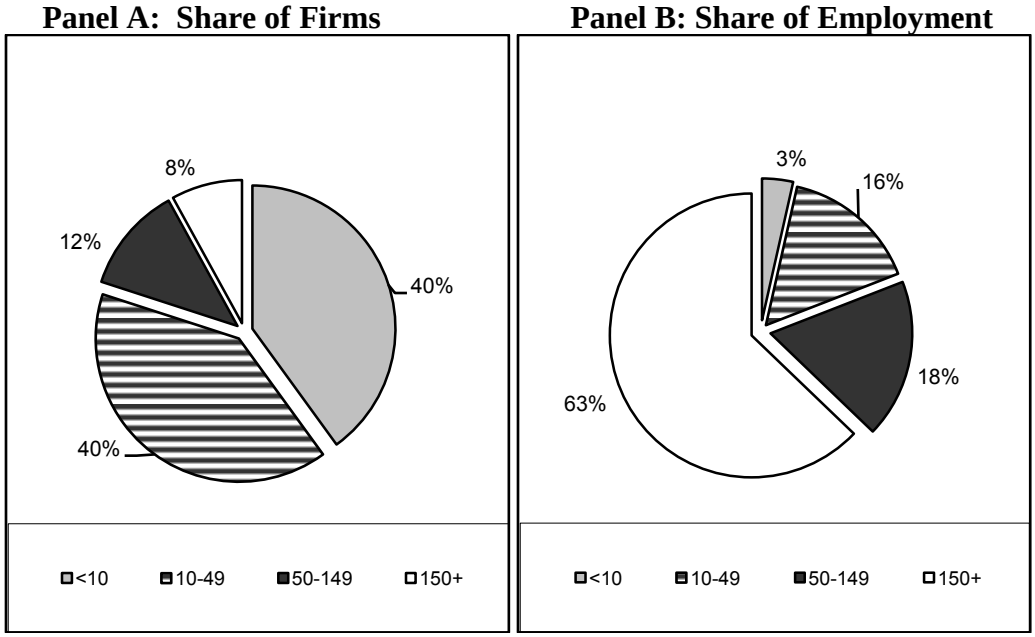
Figure 1: Total Employment and Number of Firms, 1977-1997



Source: Cote d'Ivoire Centrale de Bilans des Entreprises, 1977-1997.

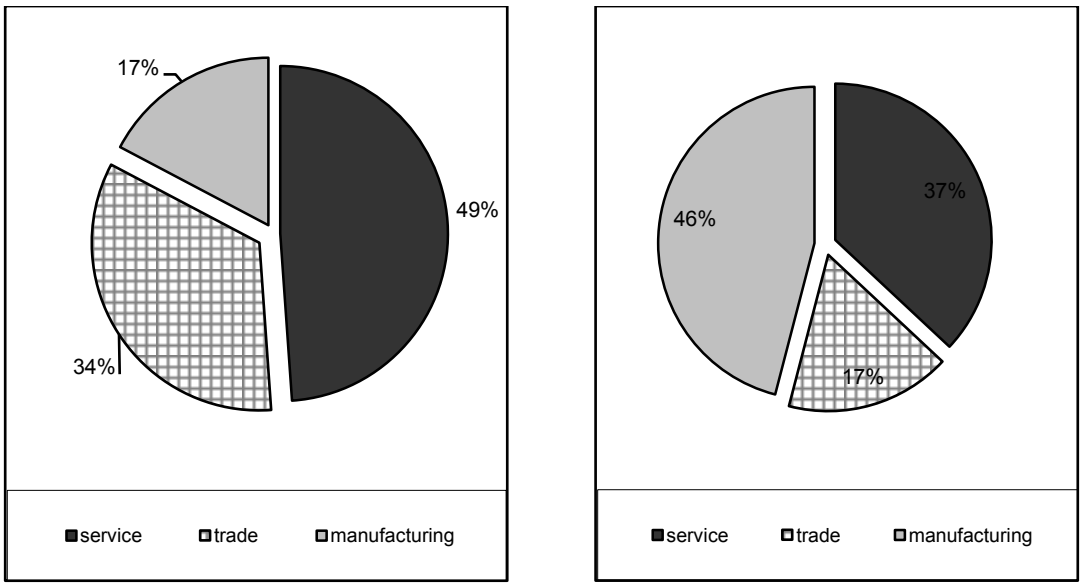
Figure 2: Distribution by Size, Average 1977-1997



Source: Cote d'Ivoire Centrale de Bilans des Entreprises, 1977-1997.

Figure 3: Distribution by Size and Sector, Average 1977-1997

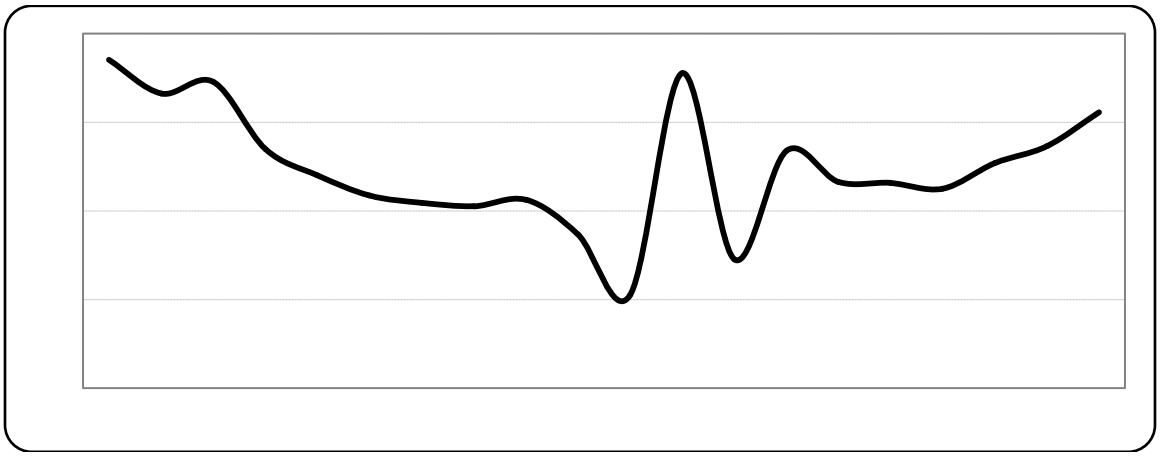
Panel A: Distribution of Firms Panel B: Distribution of Employment



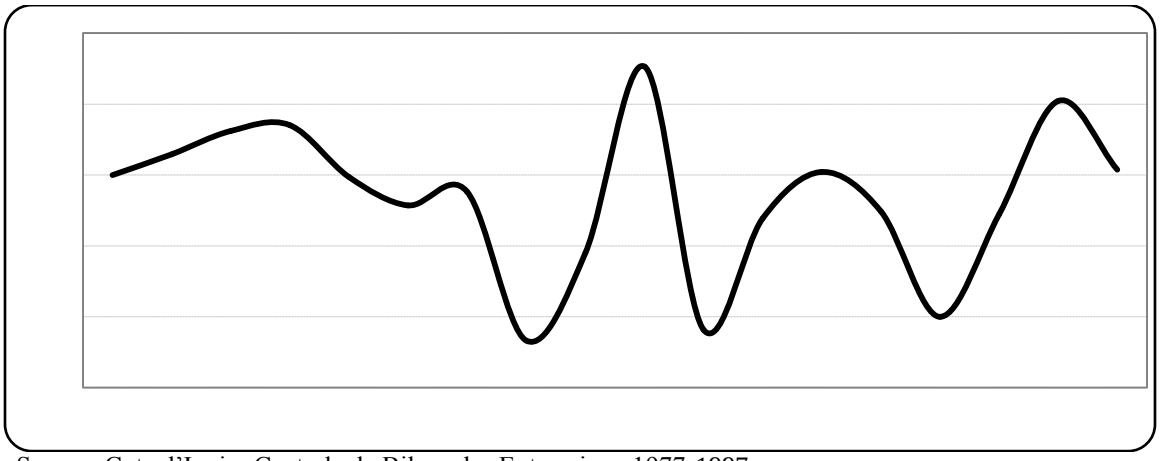
Source: Cote d'Ivoire Centrale de Bilans des Entreprises, 1977-1997.

Figure 4: Comparison of Firm Dynamics, 1978-1997

Panel A: Average Entry Rates



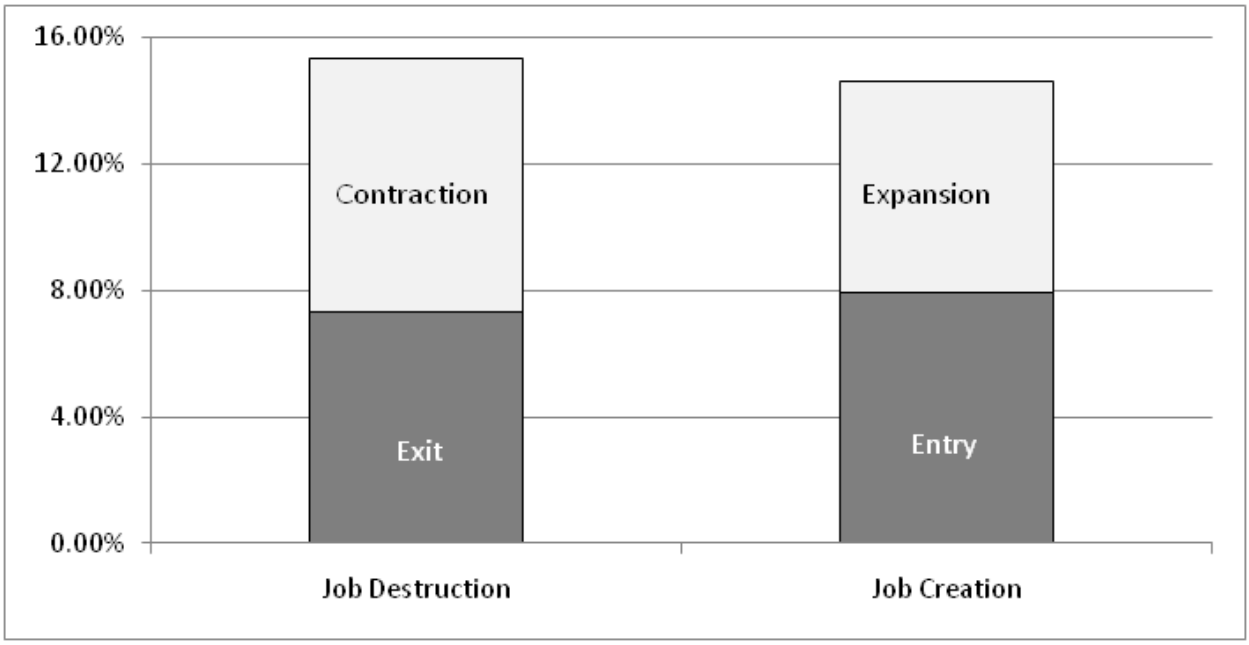
Panel B: Average Survival Rates, 1978-1995



Source: Cote d'Ivoire Centrale de Bilans des Entreprises, 1977-1997.

Figure 5: Employment Dynamics, Average 1978 – 1997

Panel A: Average Job Creation and Destruction Rates



Panel B: Average Number of Employees

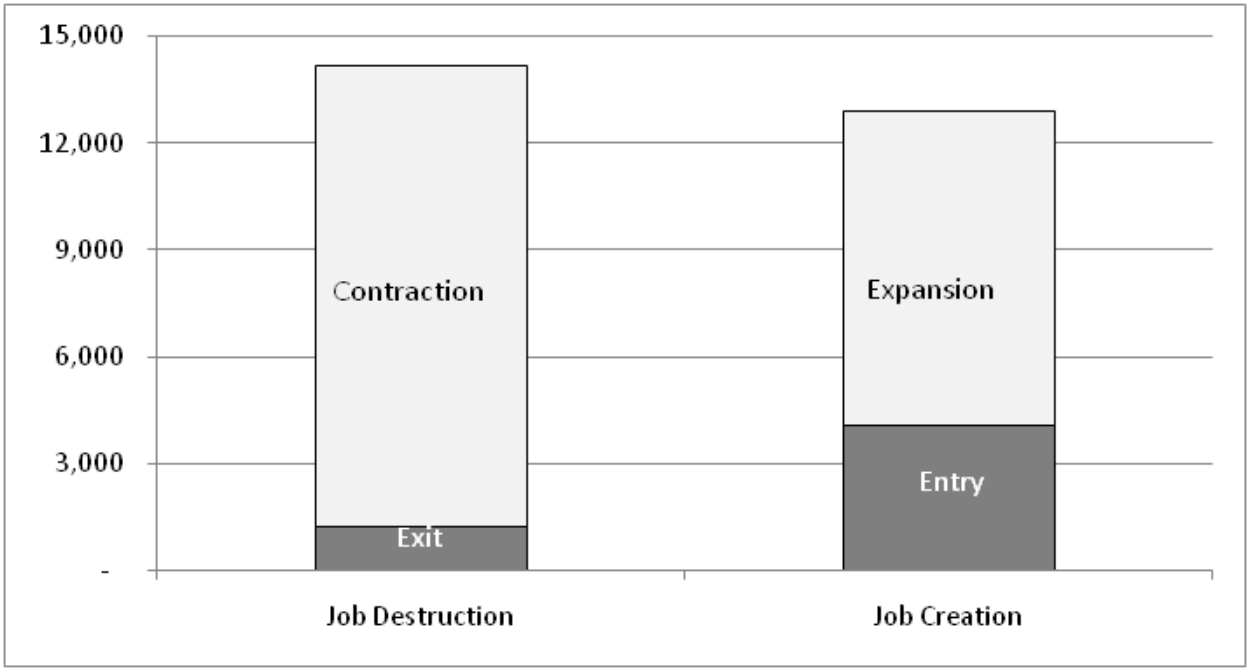
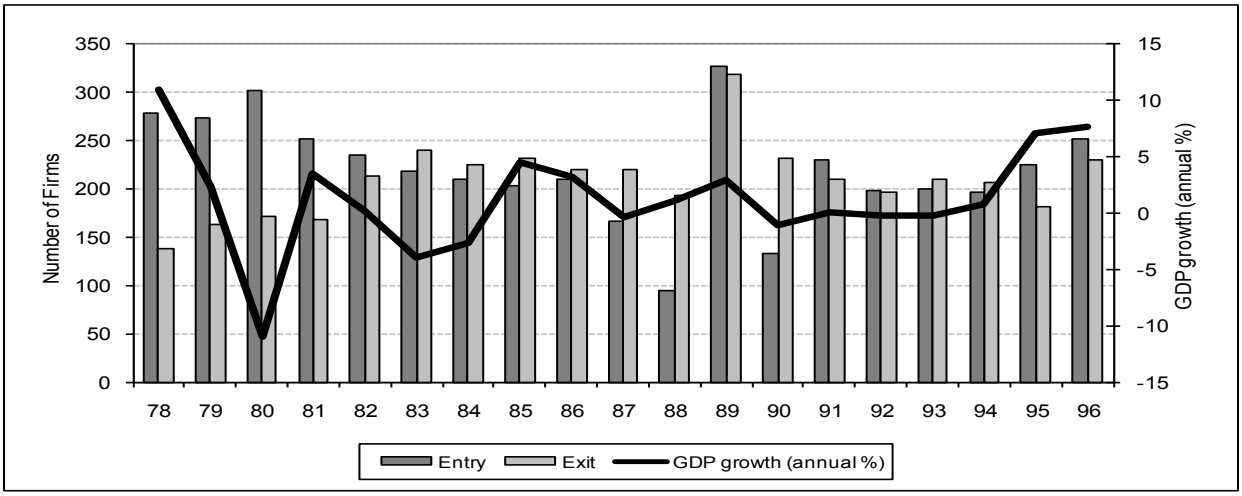


Figure 6: Cote D'Ivoire Firm Dynamics and GDP Growth

Panel A: Number of Firms and GDP Growth



Panel B: Growth in Number of Firms and GDP Growth

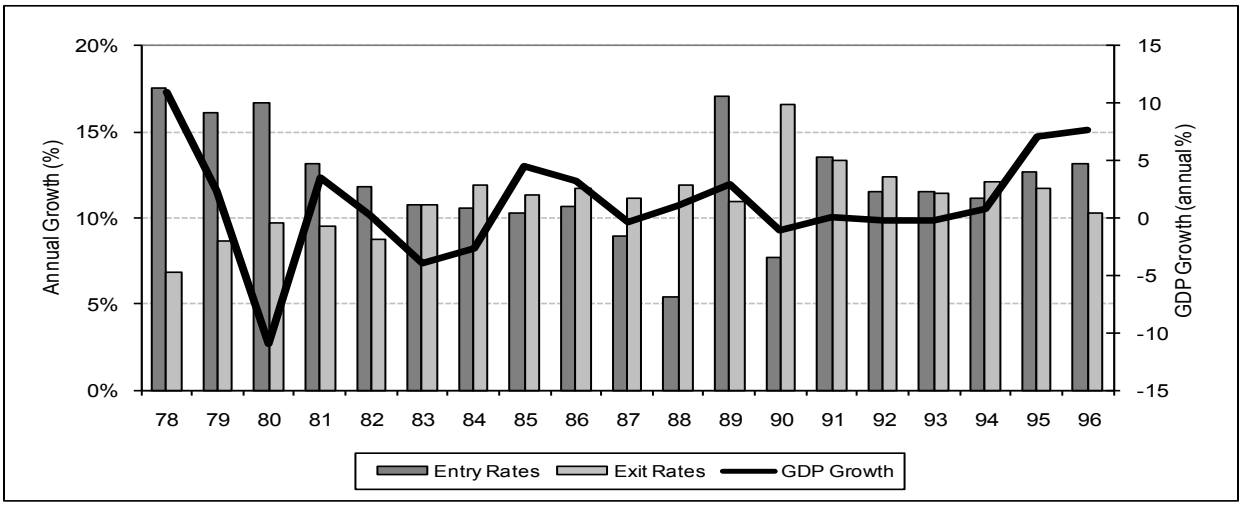


Figure 7: Cote D'Ivoire Job Dynamics and GDP Growth

Panel A: Number of Jobs Created at New Firms and Lost at Exiting Firms and GDP Growth

Panel B: Number of Jobs Created and Lost at Incumbent Firms and GDP Growth

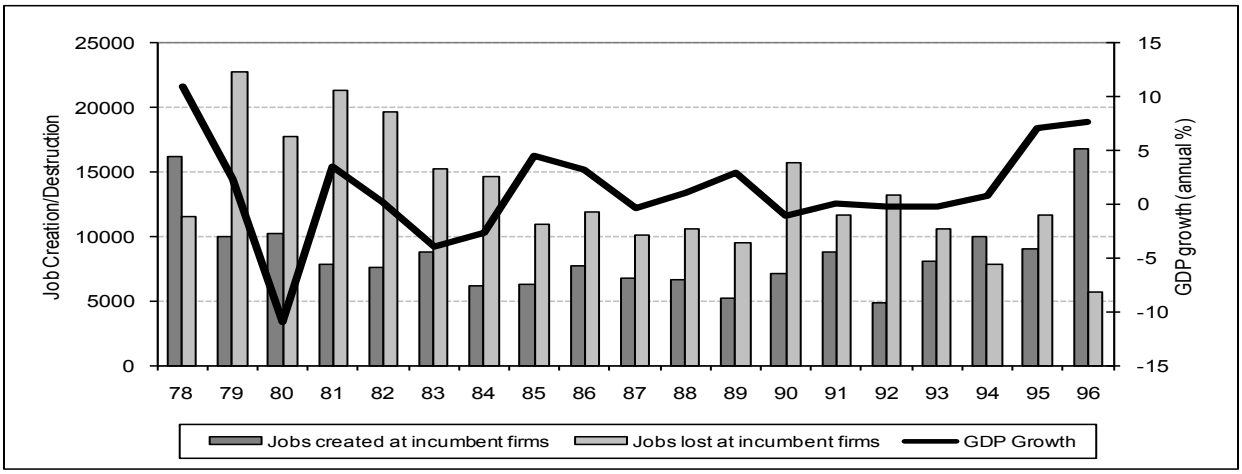


Table 1: Variables and Summary Statistics

Variable	Definition	Mean
Survival	Age of firm when it exits (in years)	6.91
Survival, Manufacturing	Age of firm, operating in manufacturing sector, when it exits (in years)	6.93
Survival, Trade	Age of firm when it exits (in years)	6.44
Survival, Services	Age of firm when it exits (in years)	7.24
Abidjan	Dummy (0/1) =1 if the firm is located in Abidjan, commerical capital region, =0 otherwise	0.90
Foreign Owner	Dummy (0/1) =1 if the firm is foreign owned, =0 otherwise	0.72
Manufacturing	Dummy (0/1) =1 if the firm operates in the manufacturing sector, =0 otherwise	0.17
Trade	Dummy (0/1) =1 if the firm operates in the retail/ wholesale trade sector, =0 otherwise	0.34
Services	Dummy (0/1) =1 if the firm operates in the service sector, =0 otherwise	0.49
Micro	Dummy (0/1) =1 if the firm has less than 10 employees, =0 otherwise	0.40
Small	Dummy (0/1) =1 if the firm has 10-49 employees, =0 otherwise	0.40
Medium	Dummy (0/1) =1 if the firm has 50-149 employees, =0 otherwise	0.12
Large	Dummy (0/1) =1 if the firm has at least 150 employees, =0 otherwise	0.08
Reform_trade	Dummy (0/1) =1 in 1985-1997, the years during and after the trade reform was undertaken	0.61
Reform_fiscal	Dummy (0/1) =1 in 1989-1997, the years during and after the fiscal/ political reform was undertaken	0.40
Reform_monetary	Dummy (0/1) =1 in 1994-1997, the years during and after the monetary reform was undertaken	0.17
GDP	Real one-year GDP growth	1.50

Table 2: GDP Growth and Firm Survival

	(1)	(2)	(3)	(4)	(5)
Abidjan	-0.080	-0.080	-0.079	-0.079	-0.079
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Foreign Owner	0.222 ***	0.221 ***	0.223 ***	0.225 ***	0.224 ***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Manufacturing	0.242 ***	0.242 ***	0.261 ***	0.242 ***	0.254 ***
	(0.06)	(0.06)	(0.07)	(0.06)	(0.07)
Trade	-0.012	-0.012	-0.002	-0.012	-0.002
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Micro	2.196 ***	2.196 ***	2.196 ***	2.216 ***	2.218 ***
	(0.14)	(0.14)	(0.14)	(0.15)	(0.15)
Small	1.211 ***	1.211 ***	1.211 ***	1.251 ***	1.252 ***
	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
Medium	0.604 ***	0.604 ***	0.604 ***	0.646 ***	0.647 ***
	(0.15)	(0.15)	(0.15)	(0.16)	(0.16)
GDP	-0.017 ***	-0.018 ***	-0.011 **	0.001	0.006
	(0.00)	(0.01)	(0.01)	(0.02)	(0.03)
GDP × Foreign Owner		0.001			0.001
		(0.01)			(0.01)
GDP × Manufacturing			-0.016		-0.010
			(0.01)		(0.01)
GDP × Trade			-0.009		-0.009
			(0.01)		(0.01)
GDP × Micro				-0.010	-0.012
				(0.02)	(0.03)
GDP × Small				-0.031	-0.032
				(0.03)	(0.03)
GDP × Medium				-0.037	-0.038
				(0.03)	(0.03)
Constant	-3.564 ***	-3.562 ***	-3.567 ***	-3.569 ***	-3.574 ***
	(0.19)	(0.19)	0.19	(0.20)	(0.20)
λ_1	-0.110	-0.111	-0.114	-0.133	-0.134
	(0.14)	(0.14)	0.14	(0.15)	(0.15)
λ_2	-0.139	-0.139	-0.143	-0.162	-0.163
	(0.12)	(0.12)	0.12	(0.13)	(0.13)
λ_3	-0.069	-0.069	-0.073	-0.089	-0.089
	(0.11)	(0.11)	0.11	(0.11)	(0.11)
λ_4	-0.020	-0.020	-0.022	-0.033	-0.034
	(0.11)	(0.11)	0.11	(0.11)	(0.11)
λ_5	0.097	0.097	0.094	0.087	0.087
	(0.10)	(0.10)	0.10	(0.10)	(0.10)
gamma variance	0.524	0.524	0.525	0.535	0.535
Observations	36529	36529	36529	36529	36529

This table reports estimates using a discrete time duration model with time-varying covariates. Standard errors are shown in parentheses, where ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table 3: GDP Growth and Firm Survival, Robustness Check

	(1)	(2)	(3)	(4)	(5)	(6)
Abidjan	0.238 *	0.237 *	-0.142	-0.151	-0.247 ***	-0.246 ***
	(0.12)	(0.12)	(0.23)	(0.23)	(0.09)	(0.09)
Foreign Owner	0.474 ***	0.476 ***	-0.020	-0.042	0.062	0.074
	(0.07)	(0.08)	(0.12)	(0.12)	(0.07)	(0.07)
Micro	2.414 ***	2.431 ***	2.438 ***	2.464 ***	1.899 ***	1.913 ***
	(0.40)	(0.41)	(0.25)	(0.26)	(0.21)	(0.21)
Small	1.343 ***	1.389 ***	1.320 ***	1.387 ***	1.017 ***	1.039 ***
	(0.40)	(0.41)	(0.22)	(0.23)	(0.21)	(0.21)
Medium	0.488	0.534	0.492 **	0.548 **	0.665 ***	0.695 ***
	(0.43)	(0.45)	(0.24)	(0.25)	(0.23)	(0.23)
GDP	-0.021 ***	-0.004	-0.025 **	-0.002	-0.013 **	0.008
	(0.01)	(0.07)	(0.01)	(0.04)	(0.01)	(0.04)
GDP × Foreign Owner		0.001		0.021		-0.007
		(0.01)		(0.02)		(0.01)
GDP × Micro		-0.010		-0.019		-0.012
		(0.07)		(0.04)		(0.04)
GDP × Small		-0.039		-0.057		-0.020
		(0.07)		(0.04)		(0.04)
GDP × Medium		-0.050		-0.043		-0.031
		(0.08)		(0.05)		(0.04)
Constant	-4.691 ***	-4.688 ***	-3.885 ***	-3.929 ***	-2.551 ***	-2.568 ***
	(0.44)	(0.46)	(0.40)	(0.41)	(0.31)	(0.32)
λ_1	0.384 *	0.357	0.530	0.544	-0.664 ***	-0.672 ***
	(0.22)	(0.23)	(0.35)	(0.35)	(0.23)	(0.23)
λ_2	0.114	0.082	0.560 *	0.571 *	-0.549 ***	-0.559 ***
	(0.19)	(0.20)	(0.31)	(0.31)	(0.20)	(0.20)
λ_3	0.121	0.088	0.573 *	0.582 **	-0.418 **	-0.425 **
	(0.18)	(0.18)	(0.29)	(0.29)	(0.17)	(0.17)
λ_4	0.018	-0.006	0.790 ***	0.801 *	-0.319 **	-0.324 **
	(0.19)	(0.19)	(0.29)	(0.29)	(0.16)	(0.16)
λ_5	0.223	0.201	0.698 **	0.711 **	-0.176	-0.179
	(0.18)	(0.18)	(0.29)	(0.29)	(0.14)	(0.14)
gamma variance	0.252	0.256	0.414	0.405	0.676	0.682
Observations	12519	12519	6391	6391	17619	17619
Sample	Trade sector	Trade sector	Manu. sector	Manu. sector	Service sector	Service sector

This table reports estimates using a discrete time duration model with time-varying covariates. Standard errors are shown in parentheses, where ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table 4: GDP Growth and Firm Survival, Robustness Check

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Abidjan	-0.137	-0.005	-0.238	-0.170	0.104	0.579 **	1.444	-0.229
	(0.09)	(0.17)	(0.33)	(0.12)	(0.16)	(0.29)	(1.10)	(0.22)
Foreign Owner	0.194 ***	0.407 ***	0.066	0.079	0.236 **	0.285 *	-0.249	0.260
	(0.07)	(0.11)	(0.19)	(0.10)	(0.11)	(0.15)	(0.29)	(0.19)
Manufacturing	0.364 ***				-0.012			
	(0.09)				(0.16)			
Trade	0.071				-0.014			
	(0.06)				(0.11)			
Micro	2.466 ***	3.470 ***	2.852 ***	2.093 ***	0.887 **	1.000	1.379 *	0.283
	(0.20)	(0.74)	(0.38)	(0.27)	(0.43)	(1.17)	(0.71)	(0.65)
Small	1.469 ***	2.275 ***	1.734 ***	1.254 ***	0.008	0.184	0.369	-0.643
	(0.19)	(0.73)	(0.33)	(0.27)	(0.43)	(1.18)	(0.69)	(0.65)
Medium	0.869 ***	1.512 **	0.804 **	0.855 ***	-0.310	0.283	-0.387	-0.701
	(0.21)	(0.76)	(0.34)	(0.30)	(0.48)	(1.26)	(0.77)	(0.73)
GDP	-0.010 **	-0.010	-0.013	-0.009	-0.032 **	-0.044 *	-0.018	-0.030
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.04)	(0.02)
Constant	-3.866 ***	-5.152 ***	-3.052 ***	-3.502 ***	-2.437 ***	-3.399 ***	-3.671 ***	-1.356
	(0.23)	(0.76)	(0.47)	(0.34)	(0.50)	(1.25)	(1.26)	(0.76)
λ_1	-0.135	0.011	-0.627 *	-0.104	0.266	0.600	0.066	0.041
	(0.15)	(0.25)	(0.36)	(0.21)	(0.25)	(0.39)	(0.59)	(0.39)
λ_2	-0.111	-0.178	-0.357	-0.001	0.376 **	0.478 *	0.026	0.371
	(0.11)	(0.20)	(0.27)	(0.17)	(0.18)	(0.27)	(0.43)	(0.27)
λ_3	0.032	0.041	-0.333	0.133				
	(0.10)	(0.17)	(0.25)	(0.14)				
gamma variance	0.665	0.458	1.085	0.666	1.094	0.724	0.743	1.375
Observations	20001	6585	3405	10011	5416	2134	896	2386
Sample	1977-1987 All sectors	1977-1987 Trade sector	1977-1987 Manu. sector	1977-1987 Service sector	1988-1996 All sectors	1988-1996 Trade sector	1988-1996 Manu. sector	1988-1996 Service sector

This table reports estimates using a discrete time duration model with time-varying covariates. Standard errors are shown in parentheses, where ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table 5: Reform Episodes and Firm Survival

	(1)	(2)	(3)
Abidjan	-0.041	-0.034	-0.081
	(0.07)	(0.07)	(0.07)
Foreign Owner	0.224 ***	0.195 ***	0.243 ***
	(0.08)	(0.07)	(0.05)
Manufacturing	0.277 ***	0.309 ***	0.277 ***
	(0.10)	(0.08)	(0.07)
Trade	-0.008	0.069	0.042
	(0.07)	(0.06)	(0.05)
Micro	2.306 ***	2.428 ***	2.265 ***
	(0.21)	(0.18)	(0.15)
Small	1.349 ***	1.417 ***	1.297 ***
	(0.21)	(0.18)	(0.15)
Medium	0.870 ***	0.868 ***	0.699 ***
	(0.23)	(0.20)	(0.16)
Reform_trade	0.616 **		
	(0.27)		
Reform_trade × Foreign Owner	0.087		
	(0.09)		
Reform_trade × Manufacturing	-0.115		
	(0.12)		
Reform_trade × Trade	-0.030		
	(0.08)		
Reform_trade × Micro	-0.269		
	(0.27)		
Reform_trade × Small	-0.296		
	(0.27)		
Reform_trade × Medium	-0.488 *		
	(0.30)		
Reform_fiscal		0.779 ***	
		(0.27)	
Reform_fiscal × Foreign Owner		0.214 **	
		(0.09)	
Reform_fiscal × Manufacturing		-0.256 **	
		(0.12)	
Reform_fiscal × Trade		-0.239 ***	
		(0.09)	
Reform_fiscal × Micro		-0.454 *	
		(0.27)	
Reform_fiscal × Small		-0.459 *	
		(0.27)	
Reform_fiscal × Medium		-0.625 **	
		(0.30)	

continued on following page.

Table 5: Reform Episodes and Firm Survival - Continued

	(1)	(2)	(3)
Reform_monetary			0.532
			(0.36)
Reform_monetary × Foreign Owner			-0.169
			(0.11)
Reform_monetary × Manufacturing			-0.247
			(0.17)
Reform_monetary × Trade			-0.410 ***
			(0.12)
Reform_monetary × Micro			-0.403
			(0.35)
Reform_monetary × Small			-0.567
			(0.35)
Reform_monetary × Medium			-0.709 *
			(0.42)
Constant	-4.025 ***	-3.937 ***	-3.581 ***
	(0.27)	(0.25)	(0.21)
λ_1	0.019	-0.096	-0.219
	(0.15)	(0.16)	(0.15)
λ_2	0.032	-0.026	-0.206
	(0.13)	(0.13)	(0.13)
λ_3	0.081	0.084	-0.139
	(0.12)	(0.12)	(0.12)
λ_4	-0.023	0.135	-0.099
	(0.11)	(0.12)	(0.11)
λ_5	0.119	0.140	0.035
	(0.10)	(0.11)	(0.11)
gamma variance	0.664	0.804	0.535
Observations	36529	36529	36529

This table reports estimates using a discrete time duration model with time-varying covariates. Standard errors are shown in parentheses, where ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.